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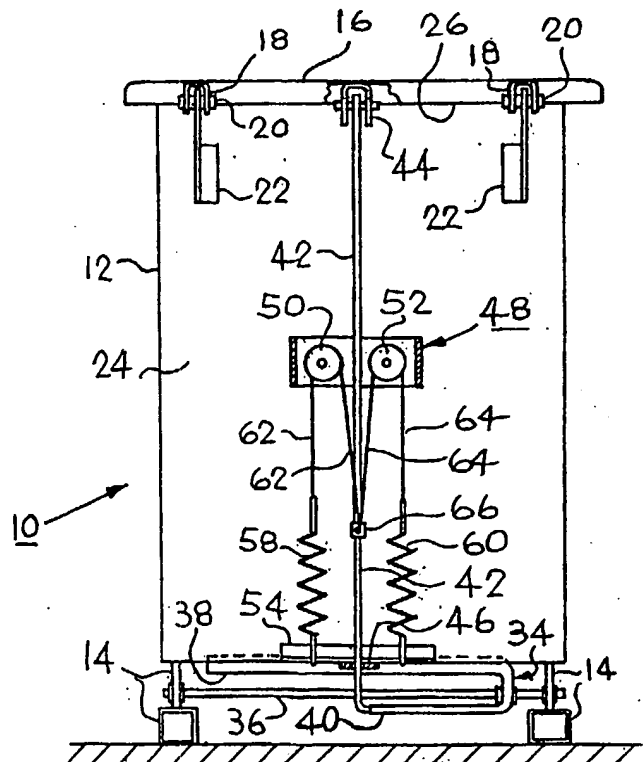
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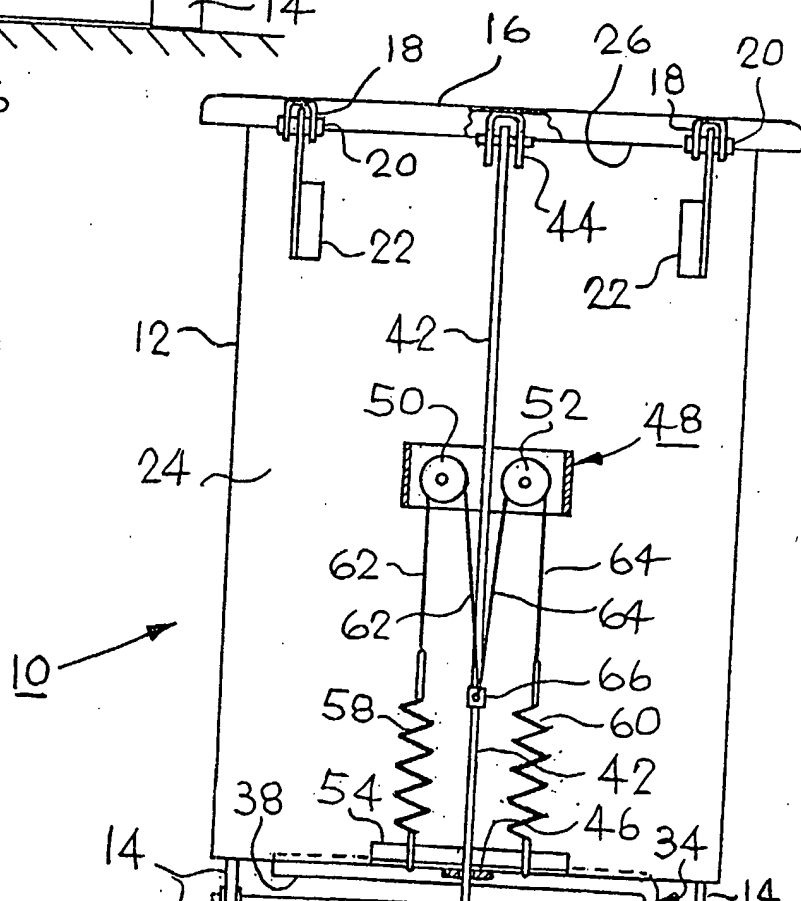
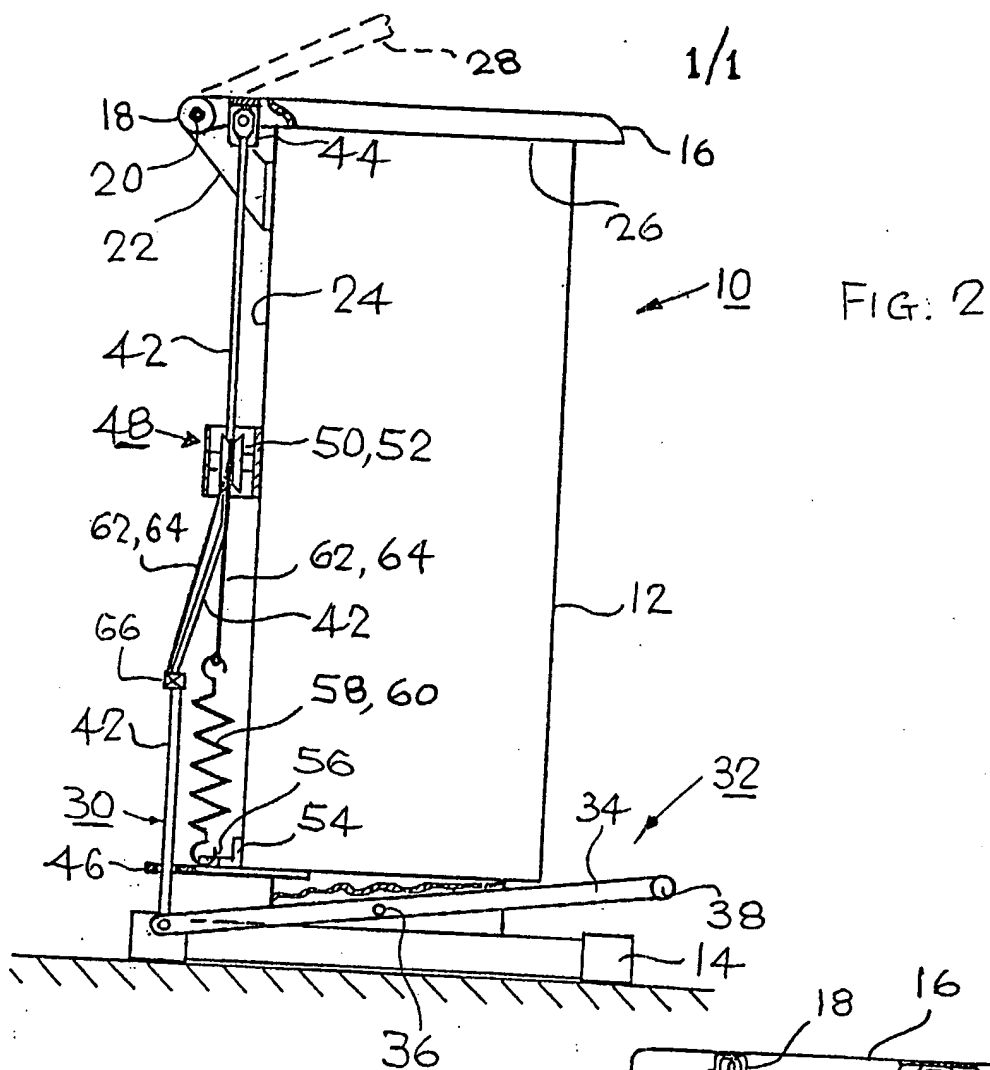
(54) Abstract Title
Refuse bin

(57) A refuse bin (10) having a hinged lid (16) biased to the closed position in contact with a rigid mouth portion (26) of a bin body (12) is provided with a spring and pulley mechanism (48-66) for progressively decelerating the lid (16) as it moves, on closing, towards the point of impact with the rigid mouth portion (26) of the bin body (12), thereby to minimise the noise emitted on impact of the bin lid (16) with the rigid mouth portion (26) of the bin body (12).

FIG. 1



GB 2 385 26



REFUSE BINS

5 This invention relates to refuse bins, and particularly to such bins that are provided with a movable lid for closing the open mouth portion of the bin body. In some such bins the lid is movable by hand from a biased 'closed' position, in which the lid closes the mouth portion, to an 'open' position in which the mouth portion is exposed for the placing of refuse in the bin body. In other bins there is provided a foot-operated pedal mechanism for moving the lid from the closed position to the open position. In all such bins, the lid returns to the closed position by gravity.

15 In most bins which are commonly in use the lid cooperates in the closed position with a rigid mouth-forming portion of the bin body on to which the lid descends heavily to impact and so close off the mouth portion. The rapid closure of the lid (under gravity) on to that rigid mouth portion produces a harsh noise, which can be annoying, and in some circumstances (as in hospitals) even distressful, to those near the bin.

25 In some bins that rigid mouth portion forms an integral part of the bin body itself; whilst in other bins that rigid mouth portion is separate, is carried by a stand, and serves as a carrier for a plastics refuse sack which then constitutes the rest of the bin body for receiving rubbish through that rigid mouth portion.

30 The present invention seeks to provide a lid damping means for controlling the descent of the lid on to the rigid mouth portion as the lid finally approaches the closed position, thereby to reduce the noise emitted on impact of the lid with the rigid mouth portion.

35 According to the present invention there is provided a refuse bin comprising a bin body having uppermost a rigid

into which refuse may be received into the

bin body, and a movable lid hinged for movement to and from a closed position in which it sits on and covers the rigid mouth portion, the lid being gravity biased to the closed position, and lid decelerating means for progressively
5 decelerating the lid, as it moves towards the closed position, in a manner such as to reduce to a low level the noise produced by the lid on impact with the rigid mouth portion of the bin body.

10 A refuse bin according to the present invention may include any of the following features:

(a) the lid decelerating means includes at least one helical tension spring, preferably two such springs, the or
15 each such spring having one end thereof secured on the bin body and the other end thereof coupled to the bin lid through a linkage arranged in such manner as to progressively increase the tension in the spring as the lid moves down towards the closed position, and where there are two springs, the respective linkages being preferably coupled
20 in a symmetrical manner with respect to the bin lid;

(b) the bin body is provided with a foot pedal pivotally mounted thereon, which pedal is coupled to the bin lid by a push rod which is so arranged that depression of the foot
25 pedal by a user's foot pushes the bin lid upwards from the closed position, and the or each said linkage is coupled to the bin lid via the push rod;

(c) where there are two said linkages and a said foot pedal and push rod, the respective springs and their
30 associated pulleys and cords are located on respective opposite sides of the push rod; alternatively, the respective springs and their associated pulleys and cords may be located all on one side only of the push rod;

(d) the or each said linkage may preferably comprise a flexible cord or wire interconnecting the associated spring
35 with a connection member on said push rod and passing around a pulley disposed between the spring and that connection member, the pulley serving to change the direction of the cord or wire from its alignment with the

direction of extension of the spring to alignment towards said connection member on the push rod;

5 (e) the or each spring may be anchored on a lower part of the bin body, in which case the associated pulley is disposed on the bin body at a position above the spring, and the associated connection member on the push rod is disposed at a position lower than the pulley;

10 alternatively, the or each spring may be anchored on an upper part of the bin body, in which case the associated pulley is disposed on the bin body at a position below the spring, and the associated connection member on the push rod is disposed below the pulley;

15 (f) the said rigid mouth portion of the bin body may comprise an integral part of the bin body; alternatively, the said rigid mouth portion of the bin body may be supported on a stand and carry a refuse sack which forms the rest of the bin body and which receives refuse through that rigid mouth portion, the bin lid being hinged on the stand for cooperation with the rigid mouth portion.

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Other features of the present invention will appear from the description that follows hereafter and from the claims appended at the end of this description.

5 One foot-operated refuse bin, and various modifications thereof, all embodying the present invention will now be described by way of example and with reference to the accompanying diagrammatic drawings, in which -

10 Figure 1 shows a rear view of the refuse bin; and

Figure 2 shows a side view of the bin as seen from the right hand side of the bin shown in Figure 1.

15 Referring now to the drawings, some parts of the structure are 'torn' away to reveal other parts that would otherwise be hidden from view. As shown, the bin (generally indicated at 10) includes a rigid bin body 12 of rectangular horizontal cross section carried on two
20 transversely-spaced integral feet 14. At its upper part the bin body is provided with a movable bin lid 16. The lid is hingedly carried by two transversely spaced brackets 18 on hinge pins 20 which are themselves carried in rearwardly extending hinge support brackets 22 secured on
25 the rear wall 24 of the bin body 12.

In normal use, a thin plastics refuse sack (not shown) is carried within the bin body 12 for receiving refuse emptied into the bin 10.

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The lid 16 is biased by its own weight to the 'closed' horizontal position shown in the Figures. In that position, it closes off the upper rigid mouth portion 26 of the bin body 12. The lid is displaceable from that
35 position to an 'open' position 28 (indicated in part only, by dotted lines) by means of a foot-operated link mechanism indicated generally at 30. In the open position the lid provides access to the bin body for receiving refuse.

The link mechanism 30 incorporates a treadle 32 which comprises a double-ended lever 34 pivotally disposed beneath the bin body 12 and carried near its centre on a horizontal spindle 36, which is itself carried by and
5 between the two bin feet 14. At its forward end the lever 34 carries a treadle bar 38 (i.e. a foot pedal) disposed in front of and parallel with the bin body 12 for operation by a user's foot. At its rear end, the lever 34 carries a
10 socketed end part 40 disposed to the rear of and lying parallel with the bin body 12.

The link mechanism 30 also includes a centrally disposed, lid-lifting push rod 42 whose lower end is secured in the socketed end part 40 of the treadle 32. At its upper end
15 the push rod 42 is pivotally coupled to a bracket 44 which is secured centrally on the underside of the rear part of the lid 16. A guide 46 secured to the base wall of the bin body locates and constrains the push rod 42, so as to prevent bowing of the push rod when subjected to
20 longitudinal operating forces.

The bin body 12 and lid 16 are both made of rigid sheet materials, preferably metal, though plastics materials may be used instead. In any event, removal of a user's foot
25 from the treadle bar 38 after depressing it to open the lid 16 will permit the lid to close rapidly under its own weight. Experience has shown that closure of the lid under its own weight gives rise to a sharp noise (not unlike that of a firearm discharge), which can be quite distressing to
30 persons within earshot, particularly if it happens frequently, and/or in a quiet place such as an hospital ward.

To reduce the noise produced on closing of the lid 16, the
35 parts now to be described are provided. Secured centrally on the rear wall of the bin body 12 is a pulley assembly generally indicated at 48. That assembly houses two

on either side of the central push rod 42.

5 An angle bracket 54 secured horizontally near the bottom of the rear wall of the bin body 12 incorporates two spring anchorage holes 56 in which are anchored the respective lower ends of two upwardly-extending helical tension springs 58,60.

10 From the respective upper ends of the two tension springs 58,60 there extend respective flexible cords (or wires) 62,64 which engage in respective peripheral grooves of the respective pulleys 50,52 and pass therefrom to and are secured on a pin 66 which is itself secured on the push rod 42. The parts of the mechanism just described are designed and adjusted so that (a) the springs 58,60 always remain in tension, (b) the lid closes quite rapidly, and (c) the tensions developed in the springs when the lid is in the closed position almost balance the gravity effect on the lid.

20 It will be appreciated that as the lid 16 closes, its centre of gravity moves away from the lid hinges so that the torque applied to the lid to close it increases as the lid moves to the closed position. This progressive increase in lid-closing torque is largely countered by the progressive increase in the resisting forces produced by the springs 58,60. The tensions in those springs progressively build up with movement of the lid to the closed position, and so apply a progressively increasing decelerating force to the push rod 42 and lid 16. Thus, the speed at which the lid finally impacts the upper mouth portion 26 of the bin body 12 is much reduced, with a consequent reduction in the noise that is produced when the lid impacts the bin body. With this arrangement, lid closure is much quieter as compared to closure when the tension springs are rendered inoperative.

In an alternative inverted arrangement of the pulleys 50,52

and springs 58,60, the springs are located above the pulleys, being anchored on an upper part of the bin body, and the cords extend downwards to and pass around only the outer sides of the respective pulleys to their junction
5 with the push rod 42.

The springs 58,60 may be of constant spring rate throughout their range of extension, or alternatively they may have a spring rate which increases with extension, progressively
10 or in steps. By "spring rate" is meant 'force per unit extension'.

In the case where a bin body 12 is constituted instead by a refuse sack suspended from an upper rectangular frame
15 member which is itself supported on a bin support stand, the lid is hinged on the stand to provide closing and opening of the sack mouth, and the lid closure-decelerating mechanism as described above is likewise mounted on the stand and operates in a manner the same as that described
20 above. (Such an alternative form of refuse bin is illustrated and described with reference to Figures 7 and 8 of British patent number GB 2323019, to which the reader's attention is directed for a further understanding of this alternative form of refuse bin.)

25 In one modified form of the bin described above with reference to the Figures, the pulley assembly 48 and the associated springs 58,60 and flexible cords 62,64 are positioned wholly to one side of the push rod 42, the
30 flexible cords being directed as desired towards the connection pin 66 on the push rod 42 by suitable guides or pulleys arranged to minimise the side thrust on the push rod.

35 In another modified form of the bin described above with reference to the Figures, the pulley assembly 48 has its respective pulleys 50,52 mounted in line with another on a

the push rod 42. As in the modified form just mentioned above, the flexible cords are directed to the connection pin 66 on the push rod 42 by suitable guides or pulleys arranged to minimise the side thrust on the push rod.

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These two modified forms are well suited for use in a retro-fit bin lid decelerating mechanism arranged for fitting to an existing refuse bin.

10 Whereas in the above description the lid decelerating means has been described in relation to a refuse bin having a foot pedal-operated lid, the lid decelerating means described above may be usefully applied to a refuse bin in which the lid is intended for manual opening only. In such
15 a case, there is no treadle, and the 'push rod' 42 would be of a length suitable for providing the requisite connection 66 with the two cords 62,64, as illustrated, and act only as a lid-decelerating rod.

20 If desired, the refuse bins described above may be equipped with means for preventing manual operation of the bin lid (for use, for example, where foot operation of the lid is mandatory, as in some situations such as hospitals or clean rooms). Such a means is described and claimed in the
25 above-mentioned British patent number GB 2323019. With such a bin, foot pedal operation is the only method of opening the bin lid.

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CLAIMS

1. A refuse bin comprising a bin body having uppermost a rigid mouth portion through which refuse may be received
5 into the bin body, and a movable lid hinged for movement to and from a closed position in which it sits on and covers the rigid mouth portion, the lid being gravity biased to the closed position, and lid decelerating means for progressively decelerating the lid, as it moves towards the
10 closed position, in a manner such as to reduce to a low level the noise produced by the lid on impact with the rigid mouth portion of the bin body.

2. A refuse bin according to claim 1, wherein the lid
15 decelerating means includes at least one helical tension spring having one end secured on the bin body and the other end coupled to the bin lid through a linkage arranged in such manner as to progressively increase the tension in the spring as the lid moves down towards the closed position.

20 3. A refuse bin according to claim 1 or claim 2, wherein the lid decelerating means includes two helical tension springs, each having one end thereof secured on the bin body and the other end thereof coupled to the bin lid
25 through a linkage arranged in such manner as to progressively increase the tension in the spring as the lid moves down towards the closed position.

30 4. A refuse bin according to claim 3, wherein the respective linkages are coupled in a symmetrical manner with respect to the bin lid.

35 5. A refuse bin according to claim 2 or 3, wherein there is provided a foot pedal pivotally mounted on the bin body and coupled to the bin lid by a push rod which is so arranged that depression of the foot pedal by a user's foot pushes the bin lid upwards from the closed position, and wherein the on each said linkage is coupled to the bin lid

via the push rod.

5 6. A refuse bin according to claim 5 as dependent on claim 3, wherein the respective springs and their associated pulleys and cords are located on respective opposite sides of the push rod.

10 7. A refuse bin according to claim 5 as dependent on claim 3, wherein the respective springs and their associated pulleys and cords are all located on one side only of the push rod.

15 8. A refuse bin according to claim 5, 6 or 7, wherein the or each said linkage comprises a flexible cord or wire interconnecting the associated spring with a connection member on said push rod and passing around a pulley disposed between the spring and that connection member, the pulley serving to change the direction of the cord or wire from its alignment with the direction of extension of the spring to alignment towards said connection member on the push rod.

20 9. A refuse bin according to claim 8, wherein the or each spring is anchored on a lower part of the bin body, the associated pulley is disposed on the bin body at a position above the spring, and the associated connection member on the push rod is disposed at a position lower than the pulley.

30 10. A refuse bin according to claim 8, wherein the or each spring is anchored on an upper part of the bin body, the associated pulley is disposed on the bin body at a position below the spring, and the associated connection member on the push rod is disposed below the pulley.

35 11. A refuse bin according to any preceding claim, wherein the said rigid mouth portion of the bin body forms an integral part of the bin body.

12. A refuse bin according to any one of the claims 1 to 10, wherein the said rigid mouth portion of the bin body is supported on a stand and carries a refuse sack which forms the rest of the bin body and which receives refuse through that rigid mouth portion, the bin lid being hinged on the stand for cooperation with the rigid mouth portion.

13. A refuse bin substantially as hereinbefore described with reference to the accompanying diagrammatic drawings.

14. A refuse bin comprising any combination of features described hereinbefore with reference to the accompanying diagrammatic drawings, other than a combination as claimed in any of the foregoing claims.



INVESTOR IN PEOPLE

Application No: GB 0203368.6
Claims searched: 1-14

Examiner: Pernille Broen Larsen
Date of search: 29 May 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X, A	X: 1, 11, 12 A: 2-10, 13-14	DE 20001431 U1 (WANG) See page 4, lines 3-9 and figures 4 and 5 and claim 1.
X, A	X: 1, 11, 12 A: 2-10, 13-14	EP 1094017 B1 (HAILO-WERK RUDOLF LOH GMBH & CO. KG) See column 4 lines 17-29, column 5 lines 23-28 and claim 1.

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^v:

Worldwide search of patent documents classified in the following areas of the IPC⁷:

B65F, B65D

The following online and other databases have been used in the preparation of this search report:

WPI, EPODOC